

Beating the Odds

By Amiko Nevills



On November 13, 2002, a routine checkup at the doctor's office suddenly turned grim for Gerald Dragoo when he suffered a massive heart attack.

Dragoo, an avid traveler and hiker, was clinging to life – not unlike the time he had fallen 50 feet from a rugged mountainside in Nevada nearly ten years earlier. In both instances, Dragoo managed to triumph over disaster. Back then, he was rescued after surviving for seven days in the wilderness. Following his heart attack, he had some help from a tiny heart-assist device co-developed by NASA engineers.

Doctors rushed Dragoo to heart specialists at Bakersfield Memorial Hospital in California. The heart attack had caused massive blockages to both the right and left sides of his heart. Doctors told his family that surgery would help to alleviate some of the blockage, but it would not be a permanent solution.

Meanwhile, Dragoo was placed on an external heart and lung machine to help keep his heart pumping and allow it to recover. Because this machine operates externally, circulating blood out of the body through the pump and back into the body, the patient remains unconscious during its operation and can only be placed on it for a short period, said Dragoo's daughter, Lara Eriksson.

Although Dragoo's will to live was thriving, his heart was failing. A heart transplant became critical for him to survive. After unsuccessful attempts to start the left side of his heart as a result of the blockage caused by the heart attack, doctors transferred Dragoo to the University of Southern California Hospital to await a donor heart.

According to the National Center for Health Statistics, cardiovascular disorders claim the lives of nearly 700,000 Americans each year, ranking heart disease as America's number one killer, coming before cancer and motor vehicle accidents. The American Heart Association estimates that a heart transplant could benefit about 40,000 Americans a year, potentially reducing the mortality rate.

However, the need for a heart transplant grossly tips the scales when weighed against the availability of new hearts. Each year, heart centers across the United States add about 100,000 new patients to extensive waiting lists for the necessary life-saving operation with little prospect of receiving one of the 2,200 a year available donor hearts.

For Dragoo, the statistics seemed insurmountable. Yet a medical marvel based on NASA technology would soon prove that the odds could be beaten. Almost one week from his initial heart attack, Dragoo received an implantable heart pump, which uses NASA-developed technology.

This miniature device weighs less than four ounces and is about one-tenth the size of other pulsating heart pumps, which pump blood in a cycle that mimics the heart. It was the pioneering result of a team of NASA engineers, including the late JSC engineer David Saucier and renowned heart surgeon Dr. Michael DeBakey, Chancellor Emeritus of Houston's Baylor College of Medicine.

A solution to develop a miniaturized left-ventricular assist device (LVAD) was found in Space Shuttle fuel and oxidizer pump technology. Although NASA engineers found the flow of Shuttle fuel to be faster than blood, they found it to be very similar in many ways and were able to design a device with one single, rotary moving part that would reduce blood clotting – a problem with other heart pumps.

A Houston-based company, MicroMed Technology, Inc., manufactures the now-called MicroMed/DeBakey VAD®. To date, the heart pump has been implanted in 190 patients, 148 of which were implanted during European trials and 42 during ongoing U.S. trials. Trials in the United States will involve about 180 total implants.

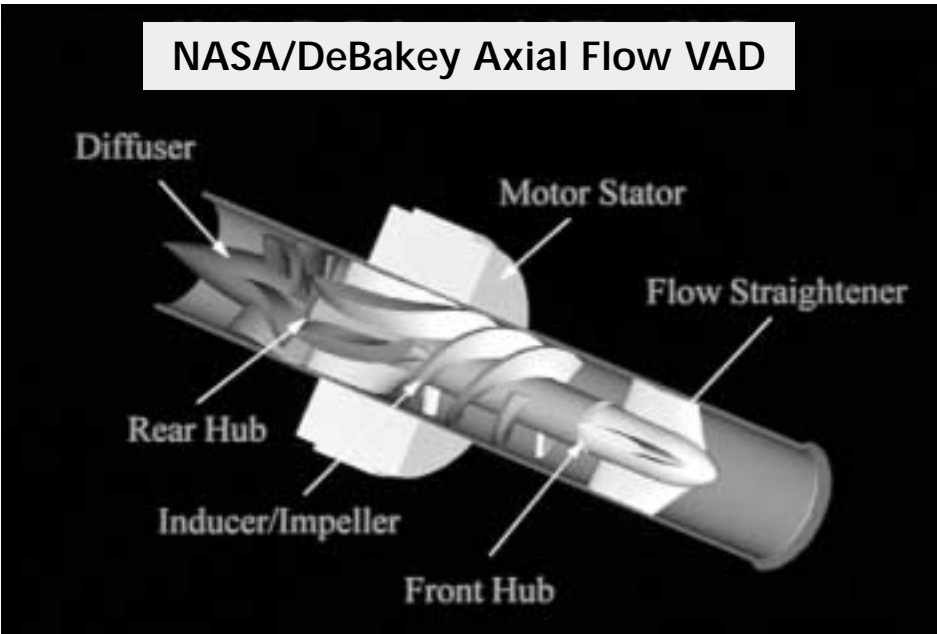
Patients have been noted to live on the MicroMed/DeBakey VAD® for as long as two years before receiving their donor heart. The LVAD is also being credited for allowing enough time for weakened hearts to repair themselves, eliminating the need of a transplant altogether.

Thanks to this medical advance and the resourcefulness of NASA's technology, Dragoo continues to survive.

"Because of the LVAD, he was able to wake up and to hear us say, 'We love you,'" Eriksson said. "Dad is alive because of it."

On Dec. 24, 2002, more than a month after the life-altering heart attack, Dragoo received his new heart. During his hospital stay, Dragoo visited other patients who would soon become LVAD patients and gave them his survival-minded words of encouragement.

"Hang in there, and don't give up," Dragoo said.



CLOCKWISE FROM TOP

Joined by his wife, Leslie, Gerald Dragoo celebrates his 57th birthday on Dec. 17, 2002 – one month after receiving the innovative heart pump.
jsc2003e46931 Photo courtesy of the Dragoo family

A cross-section diagram of the MicroMed/DeBakey VAD® illustrates the key components and inner workings of the cutting-edge heart-assist device.
s96-09311

A photo of the internal device – a rotational inducer – which increases pressure and allows blood to flow more continuously.
s99-01826